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④参考文献 実開 昭57-18753 (JP, U) 実公 昭47-10628 (JP, Y1)

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⑦実用新案登録請求の範囲

サイクロン式除塵部とその下流側の軸流形エレメント内蔵の集塵部とからなるプレクリーナ付エアクリーナにおいて、軸流形エレメントの上流側端に、断面逆L形の接着部とこれに連結する中空截頭円錐状のエアガイドとを有するエンドプレートを配設し、上記接着部を軸流形エレメントの周端側に固着して成るプレクリーナ付エアクリーナ。

考案の詳細な説明

本考案はエンジンの吸気系に装着するプレクリーナ付きエアクリーナに関する。

エアクリーナ特に多塵地帯で使用される車両のエアクリーナには、フィルタエレメントの掃除または交換時期を延長するため各種のプレクリーナ付きエアクリーナ(以下エアクリーナと略称する)がある。

その従来例として第3図に示すようにエアクリーナ10があり外筒管1内に除塵部9と集塵部13を有している。サイクロン式の除塵部9は外筒管1の一方端周端に設けた吸入口2にルーバ3を配設し、該ルーバ3で吸入エアへ旋回流をあたえ、遠心力で分離した粗粒径ダストは外筒管1の内壁4に沿つて旋回し、内壁4に固設した円筒状パイプ6と円環板7で形成されるエアガイド5の外周を旋回しながらバキュエータバルブ8に集積、排除される。集塵部13は前記除塵部9の下流側に設けられ、外筒管1内にハニカムエレメン

ト11が保持部12で固着されたもので、前記除塵部9で分離されなかつた微粒径のダストはエアガイド5の流入口15からハニカムエレメント11側へ吸引され、沪過後清浄な空気のみが接続パイプ14を経て図示しないエンジンへ吸入されるようになっている。

しかしながら上記従来のエアクリーナ10のエアガイド5は、円筒状パイプ6と円環板7で形成されており、スペースの都合でエアガイド5がハニカムエレメント11の前端に近接しているときは、流入口15から進入する微粒径のダストは、エアガイド5の円環板7の幅Wで占める円周面積分がハニカムエレメント11を覆つた状態になり、円環板7とハニカムエレメント11間の通気

抵抗が高くなり、あるいはその分が沪過面積の減少と同じになりダスト捕捉量が減少し、また保持部12でハニカムエレメント11のほぼ外周全体を外筒管1に固着しているという欠点を有していた。

したがつて、本考案は、軸流形エレメントの上流側端に、断面逆L形の接着部とこれに連結する中空截頭円錐状のエアガイドとを有するエンドプレートを配設し、上記接着部を軸流形エレメントの周端側に固着させることを可能にし、滤過面積の減少を阻止したものである。

実施例により説明すると、第1図、第2図において、エアクリーナ20は除塵部19を形成する第一外筒管21と、集塵部23を形成する第二円

筒管22を結合したものである。第二円筒管22に内蔵されるハニカムエレメント11は軸と同一方向にエアを流通させる、いわゆる軸流形エレメントであつて、従来と同じく例えば帶状戸紙と山部および谷部を有する波形戸紙を重ねて一端側の山部、他端側の谷部に接着剤を補填しながら巻回して円筒状にし、上、下流側が交互に開端、閉端の袋状通路を形成した公知のものである。そして第2図の要部説明用拡大図に示すように、前記ハニカムエレメント11の上流側周端にフランジ部18と断面L形の接着部17とさらに該接着部17から上流に向つて断面ハ形の中空截頭円錐状のエアガイド25を有したエンドプレート18を例えば接着剤で固着したものである。そしてフランジ部18を覆う断面がU字形のバッキンと、第二円筒管22とハニカムエレメント11間に挟着される円環状のバッキンとを一体的に成形した例えばゴム製の第一バッキン24がフランジ部18に被嵌されている。第1図に示した26は第二円筒管22とハニカムエレメント11間に設けた円環状の例えばゴム製の第二バッキンである。さらに第一円筒管21と第二円筒管22は前記第一バッキン24を挟圧するため図示しないハンガーボルトやクリップにより強固にクランプされている。

吸入口2のルーバ3によって旋回分離された粗粒径のダストは第一円筒管21内から中空截頭円錐状のエアガイド25の小径側から大径側へ旋回しながら進行し、バキュエータバルブ8に集積され、エンジン(図示せず)の吸気脈動でバルブV

が開閉し外部へ排出される。その場合第一円筒管21と第二円筒管22およびハニカムエレメント11の外周は挟圧された第一バッキン24によりダスト洩れはない。

5 また旋回分離されなかつた微粒径のダストは、エアガイド25の流入口27よりハニカムエレメント11に向つて吸入されるが、エンドプレート18の逆L形接着部17がハニカムエレメント11の周端部に接着されることになり、ハニカムエレメント11のほぼ全面が有効通過面積となる。なお第2円筒管22とハニカムエレメント11の下流側に装着した第二バッキン26はハニカムエレメント11の円形を保つとともに耐振作用をなす。

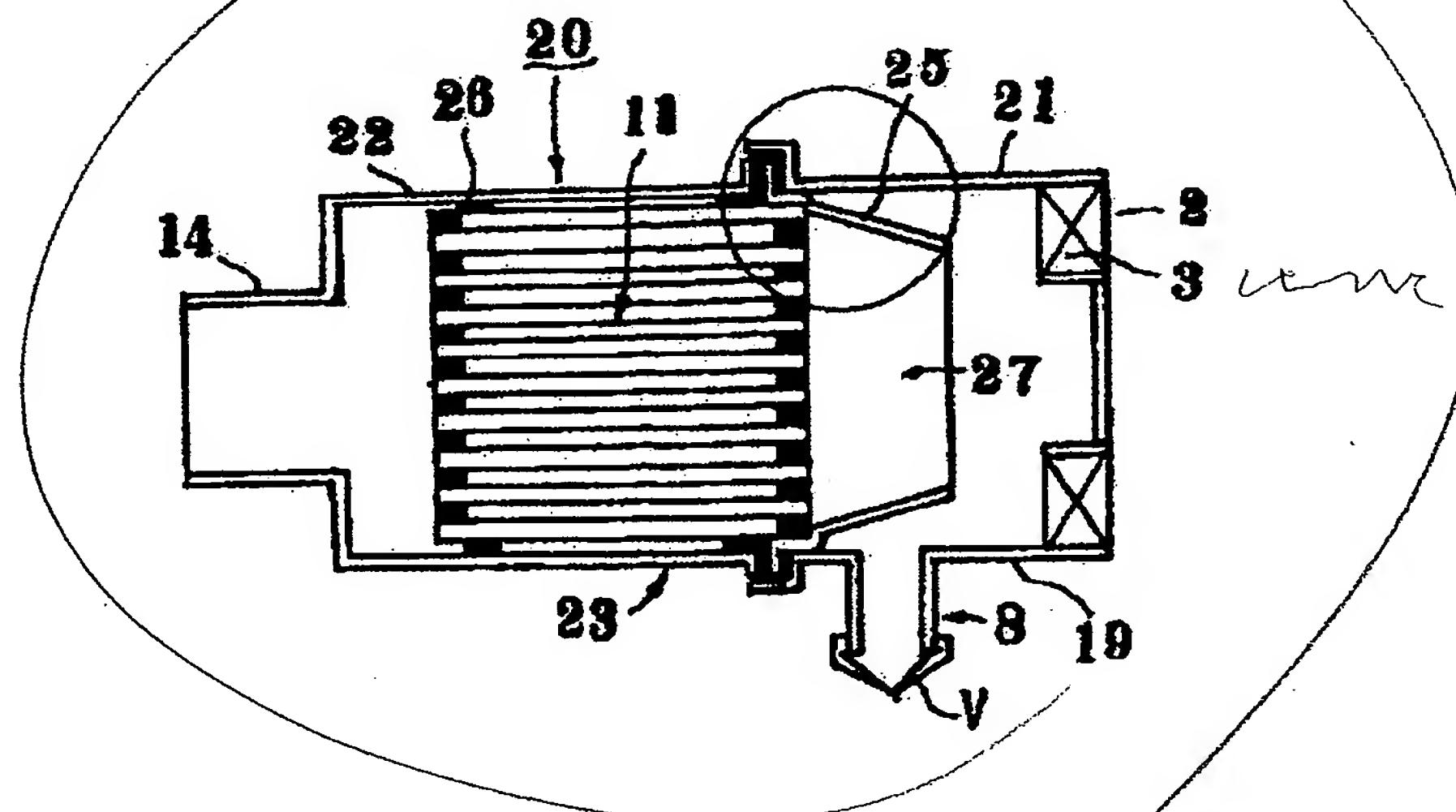
10 15 20 25 以上のように本考案は、断面逆L形の接着部とこれに連結する中空截頭円錐状のエアガイドを有するエンドプレートを軸流形エレメントの上流端側に配設したので、上記接着部が軸流形エレメントの周端部に接着されることになり、軸流形エレメントの有効面積が増し捕捉ダスト量が増加して軸流形エレメントの寿命を延長させる。

図面の簡単な説明

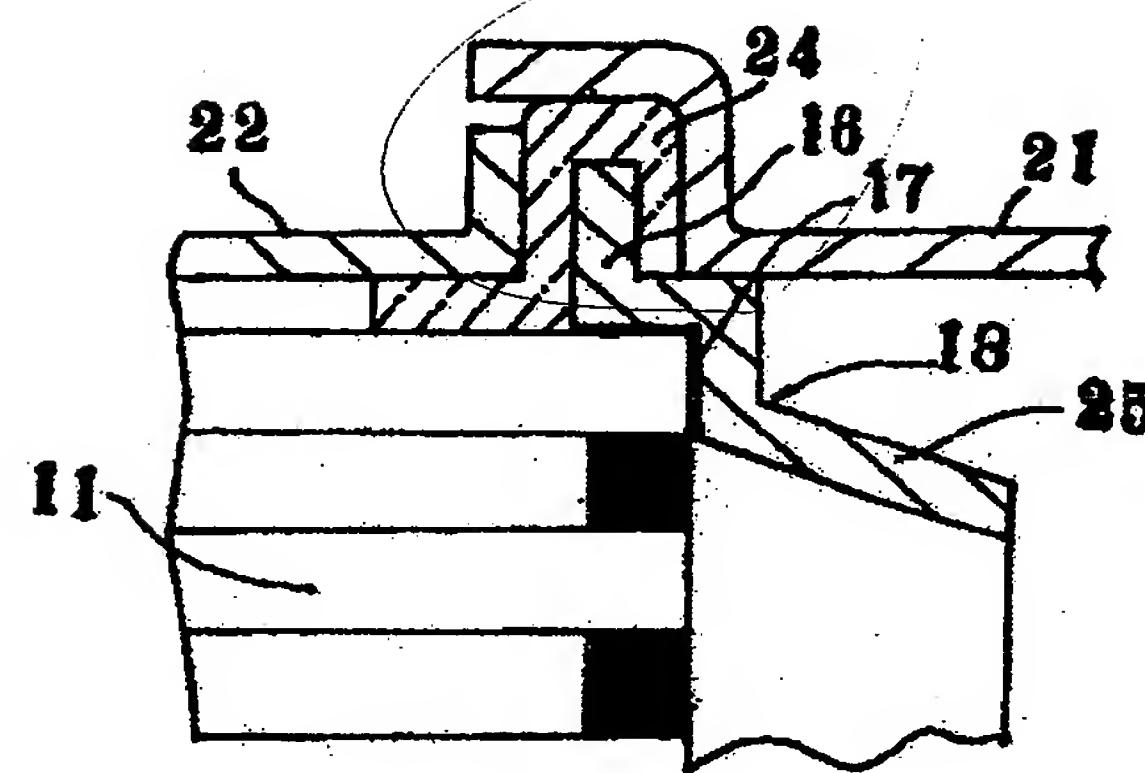
第1図は、本考案の実施例の縦断面図、第2図は第1図の要部拡大図、第3図は従来のものの縦断面図。

5, 25……エアガイド、9, 19……除塵部、10, 20……ブレクリーナ付きエアクリーナ、11……ハニカムエレメント、13, 23……集塵部、18……エンドプレート。

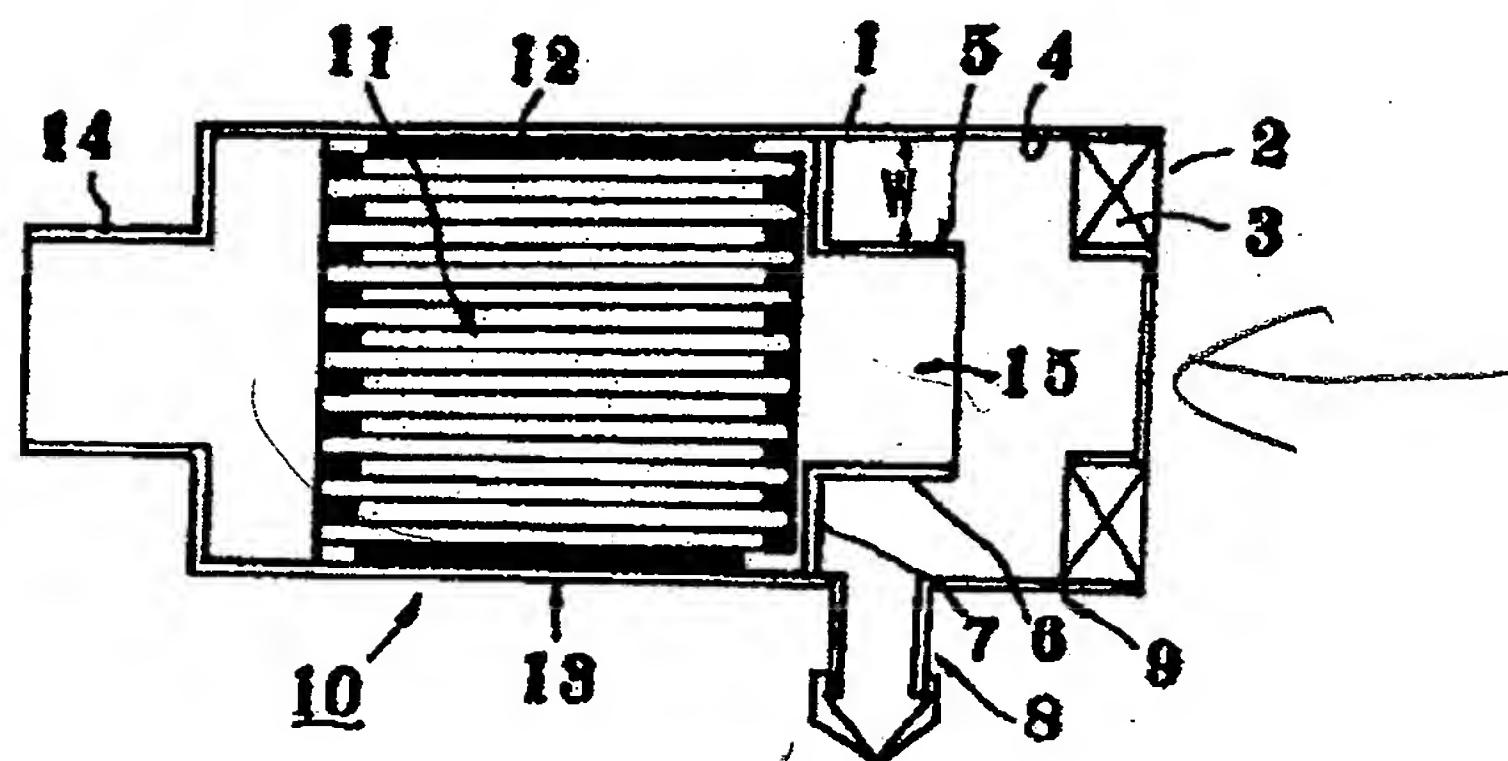
第1図



第2図



第3図



PRIOK ARG

pre cleaner
moisture scanner

Japanese Utility Model No. Hei 1[1989]-11971

Job No.: 1604-105562

Ref.: 758.1370USPF

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AIR CLEANER WITH ATTACHED PRECLEANER

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References cited: Japanese Kokai Utility Model
No. Sho 57[1982]-18753 (JP, U)
Japanese Utility Model
No. Sho 47[1972]-10628 (JP, Y1)

Examiner: Masahiro Yumita

[There are no amendments to this utility model.]

Claim

A type of air cleaner with attached precleaner characterized by the following facts: the air cleaner with attached precleaner is composed of a cyclone-type dust-removing part and a dust-collecting part, containing an axial flow-type element, downstream from said cyclone-type dust-removing part; in this air cleaner with attached precleaner, on the upstream end of the axial flow-type element, an end plate having a bonding portion with an inverted-L-shaped cross section and having a hollow truncated conical air guide is set; said bonding portion is fixed on the periphery of the end of the axial flow-type element.

Detailed explanation of the device

The present device pertains to a type of air cleaner with attached precleaner installed on the air suction system of an engine.

For air cleaners, especially those of vehicles for use in dusty areas, in order to prolong the interval for cleaning or changing the filter element, various air cleaner with attached precleaners (hereinafter referred to as air cleaners) have been proposed.

In air cleaner (10) shown in Figure 3, there are dust-removing part (9) and dust-collecting part (13) in outer tube (1). For cyclone-type dust-removing part (9), louver (3) is set on suction inlet (2) set on the periphery of one end of outer tube (1). The air sucked with said louver (3) has a circular flow. Coarse grains of dust separated by the centrifugal force are driven to rotate along inner wall (4) of outer tube (1), and, as they rotate on the outer periphery of air guide (5) formed by cylindrical pipe (6) and ring-shaped plate (7) fixed on inner wall (4), they are collected in evacuator valve (8) and are exhausted. Dust-collecting part (13) is set downstream from said dust-removing part (9), and it has honeycomb element (11) fixed inside outer tube (1) by holding part (12). The fine grains of dust not separated in said dust-removing part (9) are sucked from inlet (15) of air guide (5) to the end of honeycomb element (11), and only filtered clean air can go through tangential pipe (14) into the engine (not shown in the figure).

However, said air cleaner (10) of the prior art has the following disadvantage: It is composed of cylindrical pipe (6) and ring-shaped plate (7). In consideration of the space, air guide (5) is set near the front end of honeycomb element (11). In this case, for fine grains of dust that enter inlet (15), the circumference of ring-shaped plate (7) with width W of air guide (5) is covered by honeycomb element (11), the ventilation resistance between ring-shaped plate (7) and honeycomb element (11) increases, and the filtering area decreases proportionately, so that the dust-catching rate decreases. Also, essentially the entire outer periphery of honeycomb element (11) is fixed on outer tube (1) with holding part (12), and this is also undesirable.

On the other hand, according to the present device, on the upstream end of the axial flow-type element, an end plate is set having a bonding portion with an inverted-L-shaped cross

section and having a hollow truncated conical air guide; said bonding portion is fixed on the periphery of the end of the axial flow-type element. Consequently, a decrease in the filtering area can be prevented.

In the following, an explanation will be given regarding an application example. As shown in Figures 1 and 2, air cleaner (20) is composed of first outer pipe (21) that forms dust-removing part (19), and second cylindrical pipe (22) that forms dust-collecting part (23). They are coupled to each other. Air flows along the axis of honeycomb element (11) contained in said second cylindrical pipe (22) to form a so-called axial-flow-type element. Just as in the prior art, for example, ribbon-shaped filter paper and wavy filter paper having crests and troughs are laminated together. While adhesive is applied to the crests of one end and the troughs of the other end, the laminate is wound to form a cylinder so that bag-shaped passages with open ends and closed ends are formed and set alternately on the upstream side and downstream side. Then, as shown in Figure 2, an enlarged diagram illustrating the main portion, on the upstream peripheral end of honeycomb element (11), flange part (16) and bonding part (17) with an L-shaped cross section, as well as end plate (18) having a hollow truncated conical air guide (25) with a “>”-shaped cross section and set from said bonding part (17) towards the upstream side are bonded with an adhesive. Also, first packing (24), which is formed by monolithically molding a packing with a U-shaped cross section and covering flange portion (16) and a packing with a ring shape and held between second cylindrical tube (22) and honeycomb element (11), is fit at flange portion (16). As shown in Figure 1, ring-shaped second packing (26) made of, say, rubber, is set between second cylindrical pipe (22) and honeycomb element (11). In addition, first cylindrical pipe (21) and second cylindrical pipe (22) are clamped forcibly by a hanger bolt and clip, not shown in the figure, such that first packing (24) is held under pressure between them.

The coarse grains of dust cyclonically separated by louver (3) of suction inlet (2) rotate and move between first cylindrical pipe (21) and said hollow truncated conical shaped air guide (25), moving from its smaller-diameter end to its larger-diameter end. As a result, they are collected in evacuator valve (8). Then, with the suction pulse of the engine (not shown in the figure), they are exhausted when valve V is opened/closed. In this case, no leakage of dust occurs because of first packing (24) that is clamped onto the outer periphery of first cylindrical pipe (21), second cylindrical pipe (22) and honeycomb element (11).

On the other hand, the fine grains of dust that were not cyclonically separated are sucked from inlet (27) of air guide (25) towards honeycomb element (11). However, since bonding part (17) with an L-shaped cross section of end plate (18) is bonded to the peripheral end portion of honeycomb element (11), essentially the entire surface of honeycomb element (11) becomes an effective filtering area. Also, second packing (26) set on the downstream side of second

cylindrical pipe (22) and honeycomb element (11) acts to maintain the circular shape of honeycomb element (11) and, at the same time, it plays a vibration-proofing role.

As explained above, according to the present device, on the upstream side of the axial flow-type element, an end plate having a portion that bonds with an inverted L-shaped cross section and having a hollow truncated conical shaped air guide is set; said bonded portion is fixed on the peripheral end of the axial flow-type element. Consequently, the effective area of the axial flow-type element can be increased, the quantity of dust that can be captured increases, and the lifetime of the axial flow-type element increases.

Brief description of the figures

Figure 1 is a longitudinal cross-sectional view of an application example of the present device. Figure 2 is an enlarged view of the main portion of Figure 1. Figure 3 is a longitudinal cross-sectional view of the prior art.

- 5, 25 Air guide
- 9, 19 Dust-removing part
- 10, 20 Air cleaner with attached precleaner
- 11 Honeycomb element
- 13, 23 Dust-collecting part
- 18 End plate

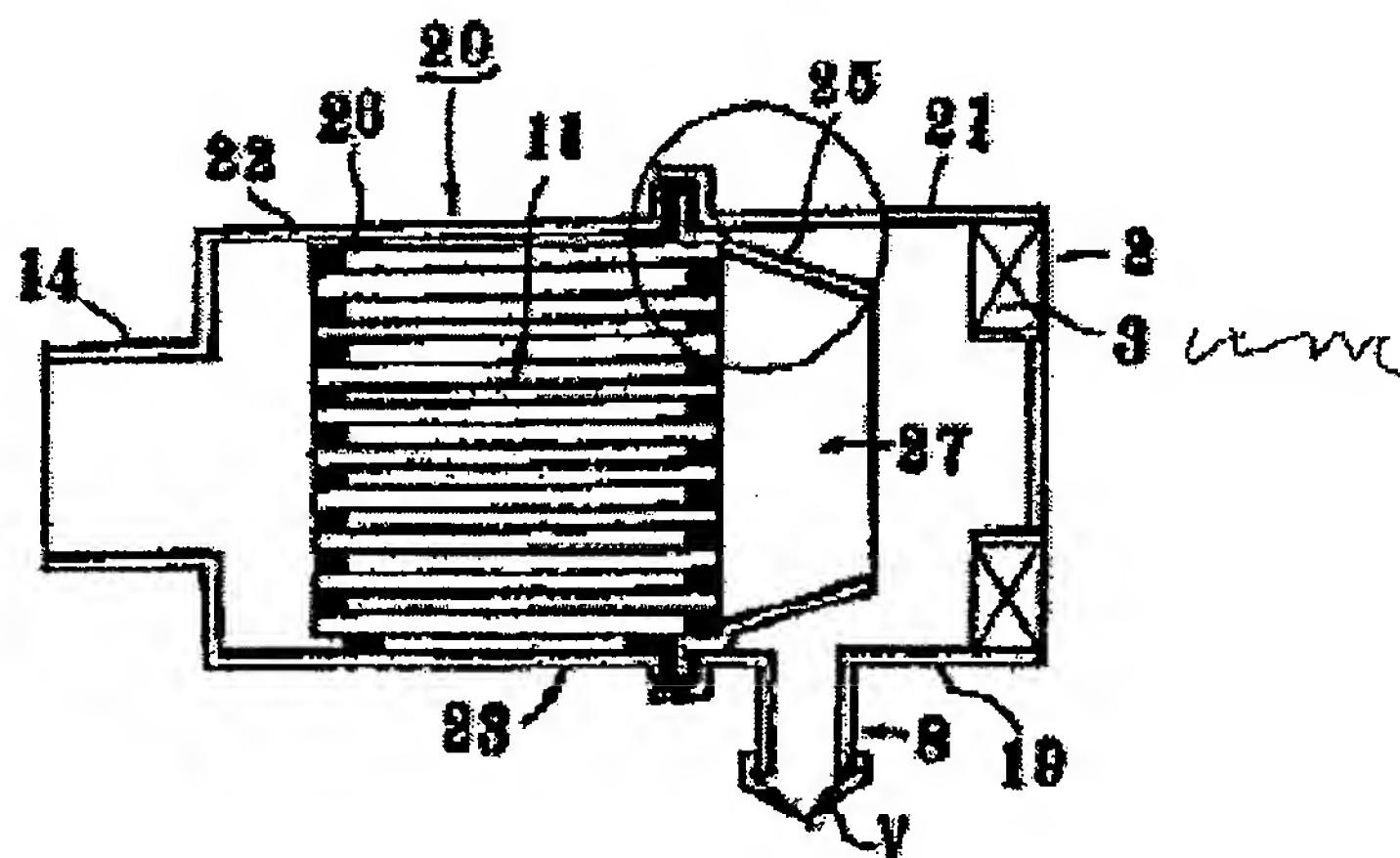


Figure 1

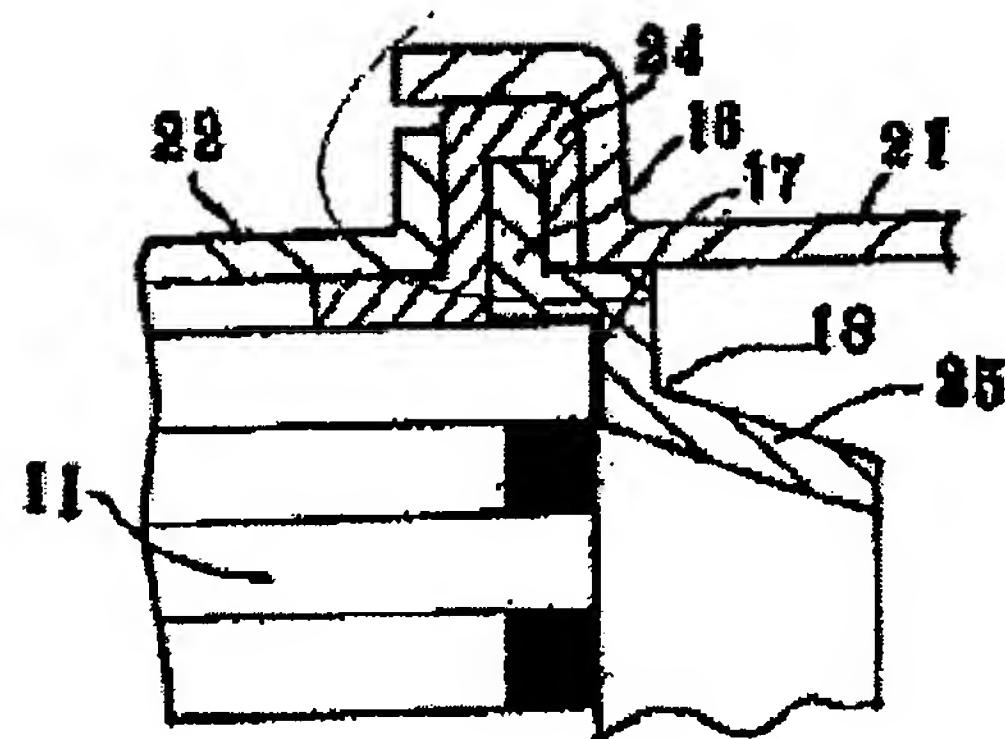


Figure 2

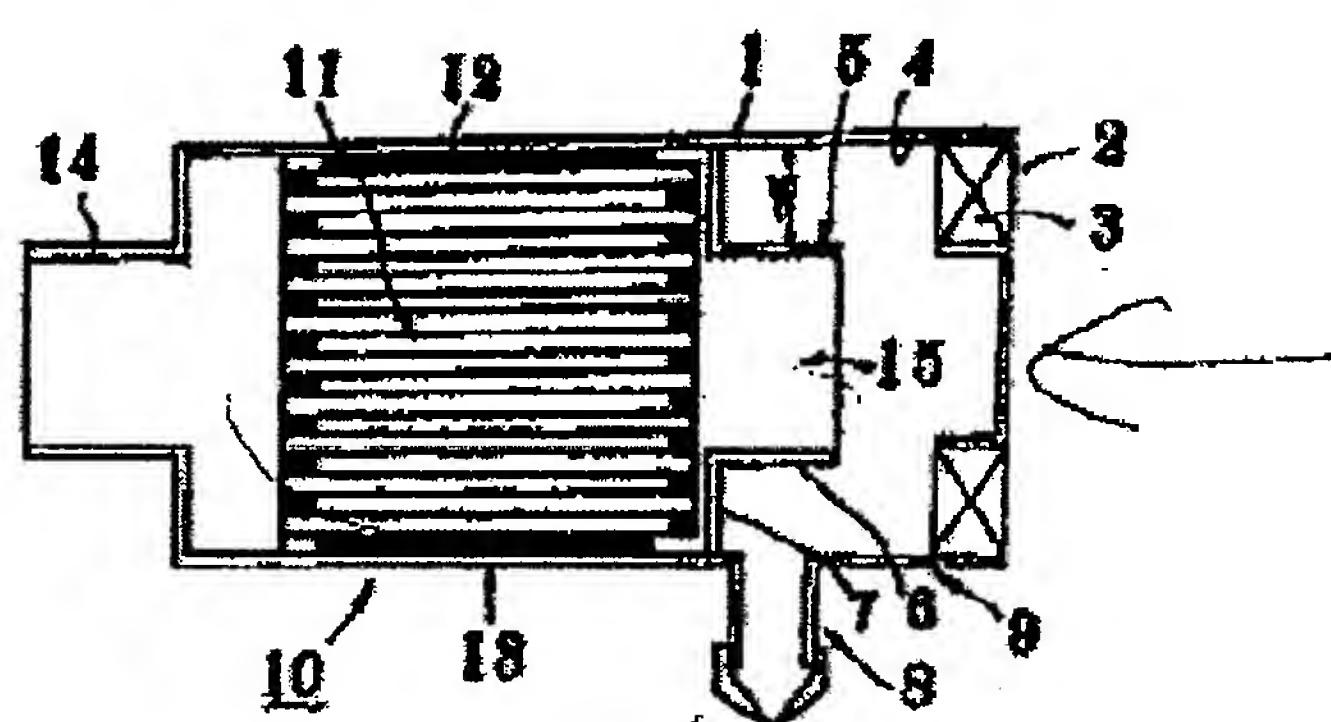


Figure 3